

CLAIMS

What is claimed is:

1. A method for battery conservation in a wireless communication system having a wireless transmit/receive unit (WTRU) and a radio network controller (RNC), the method comprising the steps of:

- requesting a battery level measurement from the WTRU by the RNC;
- measuring the battery level at the WTRU;
- reporting the battery level measurement from the WTRU to the RNC;
- storing the battery level measurement in the RNC;
- accessing the battery level measurement by radio resource management (RRM) procedures in the RNC; and

- applying the battery level measurement to the RRM procedures, whereby the battery of the WTRU is conserved due to adjustments made to the procedures based on the battery level measurement.

2. The method according to claim 1, wherein said requesting step includes sending a measurement control message from the RNC to the WTRU.

3. The method according to claim 2, wherein the measurement control message includes measurement reporting criteria.

4. The method according to claim 1, wherein said reporting step includes sending a measurement report message from the WTRU to the RNC.

5. The method according to claim 4, wherein the measurement report message includes the number of remaining minutes of talk time and the number of remaining minutes of idle time.

6. The method according to claim 4, wherein the measurement report message includes the percentage of available battery power remaining.

7. A system for battery conservation in a wireless communication system having a wireless transmit/receive unit (WTRU) and a radio network controller (RNC), comprising:

requesting means for requesting a battery level measurement from the WTRU by the RNC;

measuring means for measuring the battery level at the WTRU;

reporting means for reporting the battery level measurement from the WTRU to the RNC;

storing means for storing the battery level measurement;

accessing means for accessing the battery level measurement by radio resource management (RRM) procedures in the RNC; and

applying means for applying the battery level measurement to the RRM procedures, whereby the battery of the WTRU is conserved due to adjustments made to the procedures based on the battery level measurement.

8. The system according to claim 7, wherein said requesting means includes a measurement control message sent from the RNC to the WTRU.

9. The system according to claim 8, wherein said measurement control message includes measurement reporting criteria.

10. The system according to claim 7, wherein said reporting means includes a measurement report message sent from the WTRU to the RNC.

11. The system according to claim 10, wherein said measurement report message includes the number of remaining minutes of talk time and the number of remaining minutes of idle time.

12. The system according to claim 10, wherein said measurement report message includes the percentage of available battery power remaining.

13. The system according to claim 7 wherein said storing means includes a database in the RNC.

14. A method for call admission control in a wireless communication system having a wireless transmit/receive unit (WTRU) and a radio network controller (RNC), comprising the steps of:

- requesting a call admission by the WTRU from the RNC;
- checking the battery level of the WTRU and determining a first bit rate based upon the battery level;
- checking the cell load and determining a second bit rate based upon the cell load;
- selecting the lower bit rate among the first bit rate and the second bit rate;
- allocating physical resources for the call; and
- admitting the call at the lower bit rate.

15. A method for congestion control in the uplink of a wireless communication system having a wireless transmit/receive unit (WTRU) and a radio network controller (RNC), comprising the steps of:

- (a) receiving an interference report for each user;
- (b) calculating the average noise rise for each user;
- (c) comparing the average noise rise to a rate reduction threshold;

(d) if the average noise rise is greater than the rate reduction threshold, then performing rate reduction for the user having the highest interference level and terminating the method;

(e) if the average noise rise is less than the rate reduction threshold, then
(i) comparing the average noise rise to a rate recovery threshold; and
(ii) if the average noise rise is less than the rate recovery threshold,
then

(A) ranking the users based on interference level from lowest to highest into a candidate list;

(B) selecting the user with the lowest interference level from the candidate list;

(C) checking the selected user's WTRU battery level; and

(D) if the battery level is below the low level, then performing rate recovery for the selected user and terminating the method;

(E) if the battery level is above the low level, then selecting the next user from the candidate list and repeating step (e)(ii)(C).

16. A method for congestion control in the uplink of a wireless communication system having a wireless transmit/receive unit (WTRU) and a radio network controller (RNC), comprising the steps of:

receiving an interference report for each user;
calculating the average noise rise for each user; and
implementing congestion relieving measures based upon the average noise rise and the WTRU battery level.

17. The method according to claim 16, wherein said implementing step includes the steps of

comparing the average noise rise to a rate reduction threshold; and

if the average noise rise is greater than the rate reduction threshold, then performing rate reduction for the user having the highest interference level and terminating the method;

if the average noise rise is less than the rate reduction threshold, then

comparing the average noise rise to a rate recovery threshold; and

if the average noise rise is less than the rate recovery threshold, then performing rate recovery based upon the interference level and the WTRU battery level.

18. The method according to claim 17, wherein said performing rate recovery step includes the steps of

ranking the users based on interference level from lowest to highest into a candidate list;

selecting the user with the lowest interference level from the candidate list;

checking the selected user's WTRU battery level; and

if the battery level is below the low level, then performing rate recovery for the selected user and terminating the method;

if the battery level is above the low level, then selecting the next user from the candidate list and repeating said checking step.

19. A method for congestion control in the downlink of a wireless communication system having a wireless transmit/receive unit (WTRU) and a radio network controller (RNC), comprising the steps of:

(a) receiving a transmission power report for each user;

(b) calculating the transmission power for each user;

(c) comparing the average transmission power to a rate reduction threshold;

(d) if the average transmission power is greater than the rate reduction threshold, then comparing the average transmission power to a rate recovery threshold;

(i) if the average transmission power is greater than the rate recovery threshold, then performing rate recovery for the user with the lowest transmission power and terminating the method;

(e) if the average transmission power is less than the rate reduction threshold, then ranking the users based on transmission power from highest to lowest into a candidate list;

(i) selecting the user with the highest transmission power from the candidate list;

(ii) checking the selected user's WTRU battery level;

(iii) if the battery level is below the low level, then performing rate reduction and terminating the method;

(iv) if the battery level is above the low level, then selecting the next user from the candidate list and repeating step (e)(ii).

20. A method for congestion control in the downlink of a wireless communication system having a wireless transmit/receive unit (WTRU) and a radio network controller (RNC), comprising the steps of:

receiving a transmission power report for each user;

calculating the transmission power for each user;

implementing congestion relieving measures based upon the average transmission power and the WTRU battery level.

21. The method according to claim 20, wherein said implementing step includes the steps of

comparing the average transmission power to a rate reduction threshold;

if the average transmission power is greater than the rate reduction threshold, then comparing the average transmission power to a rate recovery threshold;

if the average transmission power is greater than the rate recovery threshold, then performing rate recovery for the user with the lowest transmission power and terminating the method;

if the average transmission power is less than the rate reduction threshold, then performing rate reduction based upon the average transmission power and the WTRU battery level.

22. The method according to claim 21, wherein said performing rate reduction step includes the steps of

ranking the users based on transmission power from highest to lowest into a candidate list;

selecting the user with the highest transmission power from the candidate list;

checking the selected user's WTRU battery level;

if the battery level is below the low level, then performing rate reduction and terminating the method;

if the battery level is above the low level, then selecting the next user from the candidate list and repeating said checking step.

23. A method for user link maintenance in a wireless communication system having a wireless transmit/receive unit (WTRU) and a radio network controller (RNC), the method being triggered by receipt of a WTRU battery level measurement and comprising the steps of:

comparing the measured battery level to a low level;

if the battery level is below the low level, then decreasing the bit rate for a user on the uplink, increasing the bit rate for a user on the downlink, and terminating the method;

if the battery level is above the low level, then comparing the battery level to a high level;

if the battery level is above the high level, then determining whether the link rate was previously reduced;

if the link rate was previously reduced, then determining whether a measured transmission power and a measured interference are low;

if both the transmission power and the interference are not low, then performing rate recovery, whereby the uplink rate and the downlink rate for the user are restored to the last rate before rate reduction occurred.

24. A method for user link maintenance in the uplink of a wireless communication system having a wireless transmit/receive unit (WTRU) and a radio network controller (RNC), comprising the steps of:

receiving the WTRU's transmit power measurement in the uplink;

comparing the power measurement to a rate reduction threshold; and

if the power measurement is above the rate reduction threshold, then performing rate reduction and terminating the method;

if the power measurement is below the rate reduction threshold, then comparing the power measurement to a rate recovery threshold;

if the power measurement is below the rate recovery threshold, then checking the WTRU battery level;

if the WTRU battery level is above the low level, then performing rate recovery.

25. A method for user link maintenance in the downlink of a wireless communication system having a wireless transmit/receive unit (WTRU) and a radio network controller (RNC), comprising the steps of:

receiving the code transmit power measurement in the downlink;

comparing the power measurement to a rate reduction threshold; and

if the power measurement is above the rate reduction threshold, then

checking the WTRU battery level; and

if the battery level is above the low level, then performing rate reduction;
if the power measurement is below the rate reduction threshold, then comparing the power measurement to a rate recovery threshold;
if the power measurement is below the rate recovery threshold, then performing rate recovery.

26. A method for executing handover in a wireless communication system having a wireless transmit/receive unit (WTRU) and a radio network controller (RNC), comprising the steps of:

receiving a handover request at the RNC;
determining whether additional handover requests are pending at the RNC;
if additional handover requests exist, then
 ordering the WTRUs by battery level, from lowest to highest; and
 selecting the WTRU with the lowest battery level;
determining the number of soft handover legs; and
executing the handover using as few soft handover legs as possible.

27. A method for power control in a wireless communication system having a wireless transmit/receive unit (WTRU) and a radio network controller (RNC), comprising the steps of:

obtaining a battery level measurement from the WTRU; and
adjusting operating parameters of the WTRU in response to the battery level measurement.

28. The method according to claim 27, wherein said obtaining step includes the steps of

requesting a battery level measurement from the WTRU by the RNC;
measuring the battery level at the WTRU;
reporting the battery level measurement from the WTRU to the RNC; and

storing the battery level measurement in the RNC.

29. The method according to claim 27, wherein said adjusting step includes the steps of

comparing the battery level measurement with the low level;

if the battery level measurement is less than the low level, then configuring the WTRU with low battery level settings;

if the battery level measurement is greater than the low level, then comparing the battery level measurement with the medium level;

if the battery level measurement is greater than the medium level, then configuring the WTRU with high battery level settings.

30. The method according to claim 29, wherein said configuring the WTRU with low battery level settings step includes the steps of

setting the block error rate to a low quality value;

initiating a link maintenance procedure; and

setting application parameters to conserve battery life and for the highest available level of compression.

31. The method according to claim 29, wherein said configuring the WTRU with high battery level settings step includes the steps of

setting the block error rate to a high quality value;

checking the currently used level of compression; and

if using the highest level of compression, then setting application parameters to use a low level of compression.